

Claims

- 1 1. A water feeder controller for a boiler comprising:
 - 2 an input for receiving a low water signal from a sensor, the signal indicating a
 - 3 low water level in the boiler;
 - 4 an output for connection to a feed valve capable of supplying water to the boiler
 - 5 at a predetermined feed rate;
 - 6 a delay timer having a delay timer period, the delay timer being connected to
 - 7 the input to begin timing for the delay timer period responsive to the low
 - 8 water signal from the sensor;
 - 9 a feed counter;
 - 10 a feed timer having a feed timer period,
 - 11 the feed timer being connected to the delay timer to begin timing for the
 - 12 feed timer period after the delay timer period,
 - 13 the feed timer being connected to the output to turn on the feed valve during
 - 14 the feed timer period, and
 - 15 the feed timer being connected to the feed counter to increment the feed
 - 16 counter during the feed timer period; and
 - 17 a display connected to the feed counter to display a number corresponding to
 - 18 the quantity of water supplied by the feed valve to the boiler.
- 1 2. The water feeder controller for a boiler according to claim 1 further
 - 2 including a display reset button connected to reset the feed counter and thereby
 - 3 reset the display to a zero quantity of water supplied by the feed valve to the boiler.
- 1 3. The water feeder controller for a boiler according to claim 1 further
 - 2 including a manual feed button connected to open the feed valve when the manual
 - 3 feed button is pressed, the manual feed button also being connected to increment
 - 4 the feed counter when the manual feed button is pressed.

1 4. The water feeder controller for a boiler according to claim 1 further
2 including a microcontroller, the delay timer, the feed timer and the feed counter
3 being implemented in software in the microcontroller.

1 5. The water feeder controller for a boiler according to claim 4 wherein the
2 delay timer includes a delay loop in the software, the delay loop repetitively cycling
3 through program steps of the software during the delay period.

1 6. The water feeder controller for a boiler according to claim 5 wherein the
2 delay loop includes a program step for checking the input to detect the low water
3 signal, the software exiting the delay loop without starting the feed timer if the
4 sensor indicates the presence of sufficient water in the boiler during the delay
5 period.

1 7. The water feeder controller for a boiler according to claim 5 wherein the
2 delay loop includes a program step for determining if the delay loop has been
3 cycling for the delay period, the delay loop starting the feed timer thereafter.

1 8. The water feeder controller for a boiler according to claim 5 further
2 including a manual feed button connected to open the feed valve when the manual
3 feed button is pressed, the delay loop including a program step for determining if
4 the manual feed button has been pressed during the delay period.

1 9. The water feeder controller for a boiler according to claim 5 further
2 including a display reset button connected to reset the feed counter and thereby
3 reset the display to a zero quantity of water supplied by the feed valve to the boiler,
4 the delay loop including a program step for determining if the display reset button
5 has been pressed during the delay period.

1 10. The water feeder controller for a boiler according to claim 4 wherein the
2 feed timer includes a feed loop in the software, the feed loop repetitively cycling
3 through program steps during the feed timer period.

1 11. The water feeder controller for a boiler according to claim 10 wherein the
2 feed loop continues to keep the feed valve turned on during the entire feed period
3 without regard to the low water signal.

1 12. The water feeder controller for a boiler according to claim 10 wherein the
2 feed loop includes a program step for determining if the feed loop has been cycling
3 for the feed period, the feed loop passing program control to a reset loop thereafter,
4 the reset loop including a program step for checking the input to detect the low
5 water signal, the reset loop starting the delay timer if the sensor indicates a low
6 water level in the boiler.

1 13. The water feeder controller for a boiler according to claim 10 further
2 including a display reset button connected to reset the feed counter and thereby
3 reset the display to a zero quantity of water supplied by the feed valve to the boiler,
4 the feed loop including a program step for determining if the display reset button
5 has been pressed during the feed period.

1 14. The water feeder controller for a boiler according to claim 10 wherein the
2 feed loop includes a program step for incrementing the feed counter.

1 15. The water feeder controller for a boiler according to claim 4 wherein the
2 software includes a program step for stopping the feed timer from overfeeding water
3 to the boiler by repetitively turning on the feed valve.

1 16. The water feeder controller for a boiler according to claim 15 wherein the
2 program step for stopping the feed timer from overfeeding water to the boiler

3 comprises a program step for checking the number of times the feed timer has been
4 sequentially started.

1 17. The water feeder controller for a boiler according to claim 16 wherein the
2 program step for checking the number of times the feed timer has been sequentially
3 started passes program control to a lockout loop if the number of times the feed
4 timer has been sequentially started exceeds a desired value, the lockout loop
5 preventing the feed timer from being restarted.

1 18. The water feeder controller for a boiler according to claim 17 wherein the
2 lockout loop includes a program step for checking the input to detect the low water
3 signal, the software exiting the lockout loop if the sensor indicates the presence of
4 sufficient water in the boiler.

1 19. The water feeder controller for a boiler according to claim 17 further
2 including a manual feed button connected to open the feed valve when the manual
3 feed button is pressed, the lockout loop including a program step for determining if
4 the manual feed button has been pressed.

1 20. The water feeder controller for a boiler according to claim 17 further
2 including a display reset button connected to reset the feed counter and thereby
3 reset the display to a zero quantity of water supplied by the feed valve to the boiler,
4 the lockout loop including a program step for determining if the display reset button
5 has been pressed.

1 21. A method of controlling a water feeder for a boiler comprising the steps of:
2 receiving a low water signal from a sensor in a boiler, the low water signal
3 indicating the presence or absence of sufficient water in the boiler;
4 delaying for a delay period of time after receiving the low water signal;
5 checking the low water signal after the delay period;

6 feeding water to the boiler for predetermined feed period of time if the low
7 water signal indicates insufficient water in the boiler after the delay period;
8 and
9 displaying the quantity of water supplied to the boiler based on the period of
10 time water is fed to the boiler.